THE SNAKES

OF

TANGANYIKA TERRITORY

BY

A. LOVERIDGE, C.M.Z.S., F.E.S.

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The manuscript of the following article was handed in at Dar es Salaam just before the writer left for England on leave. No opportunity for proof-reading was possible, hence the many omissions in punctuation and not a few printer's errors in the spelling of scientific names.

A. L.

The Snakes of Tanganyika Territory.

For a newcomer the words "Equatorial Africa" are apt to conjure up visions of a land teeming with serpent life, and cause him on arrival to look suspiciously in such corners of his house as he may think will harbour these reptiles or scan his path with quite unnecessary caution when first he penetrates the bush. Until he has resided in the country for some time he will not realise that snakes do not obtrude their presence as a rule and though Tanganyika Territory can boast of 102 species one may go many months without seeing one and after eight years in East Africa I am still of the opinion that one afternoon spent on Dorset heaths or mid the bracken and gorse of a Welsh mountain-side will give better sport and result in a larger bag than several days spent searching for snakes in East Africa.

The snakes of this Territory are grouped in five families of which the first two include only very degraded and worm-like forms entirely adapted to a subterranean existence. So much so that the eyes are not distinguishable in some species whilst in the remainder they are just visible under one of the head-shields. They are rarely met with except after a shower which induces them to come to the surface over which they wander in search of fresh quarters. When kept in captivity they promptly bore they way beneath the ground obtaining a purchase with their tails which, terminating in a little spine are an object of terror to many natives though all the species are perfectly harmless.

Of the family of Blind Snakes (*Typhlopidae*) there are thirteen species in the Territory, mostly of small size though one kind met with at Morogoro and Kilosa reaches a length of three feet. It is as thick as a man's thumb along its entire length for these Blind Snakes do not taper to any appreciable extent as it would be a ninderance to their burrowing operations. They may be sometimes found beneath stones or in termite's nests whither they go in search of food for they feed almost exclusively on termites.

The Worm Snakes (*Glauconiidae*) have been very aptly named, some of this family are colourless or pale fleshy pink (*G. emini*) exactly like a worm, one was found by the writer in a small manure heap on the golf links at Dar es Salaam. The more usual colour, however, is a jet or silvery black (*G. distanti*, etc.) and none of the species are much thicker than the lead out of an ordinary pencil. When picked up they squirm very actively and

are difficult to hold on account of their highly polished scales. Like the Blind Snakes they come to the surface at times but the best place to search for them is at the root of shrubs or when stumps are being removed from a shamba. Like the members of the last family they also feed on termites but on placing one in a box with a portion of comb from a termite's nest I found the snake dead the following morning with two soldier termites biting it. Their mouth is minute and they are of course innocuous.

The family of the Boas and Pythons (*Boidae*), has but two representatives in the Territory and one of these only occurs in the northern parts. This is the small Sand Boa, about two feet in length and resembling a viper rather than a boa. The ground colour is a salmon-pink heavily blotched with chocolate-brown, it is adapted to burrowing just beneath the surface and is usually found in sandy soil. It feeds upon mice and small birds which it constricts in true boa fashion. Its headquarters are in North East Africa and the writer has only met with a single specimen in the Territory and that was at Kahe. Across the border it is found at Mbunyi and Voi.

Our big constrictor, however, is the Rock or Water Python as it is variously called, which ranges over the whole of tropical Africa south of the Sahara and occurs throughout the Territory in suitable localities, it is particularly numerous in the Morogoro District, I have also met with it at Arusha, Longido and Usshora.

It shows a preference for the rocks and undergrowth fringing a stream or river and may sometimes be seen hanging from a tree above the water, but it turns up in all sorts of places and I have known of several big fellows being killed in native huts whither they had doubtless gone in search of food. At Morogoro on one occasion whilst digging out a monitor lizard my native assistants had a surprise. We had burnt off the tall sedges which overhung and trailed into the water, one native had begun to dig, whilst I waited with a forked stick for the creature to break out. Seeing that the bank was cracked and that the dislodgement of the loose portion would facilitate matters I reached down with my left foot and calling to the boys, who were standing knee-deep in water, to stand clear, pushed it so that it went rolling down into the stream. Almost simultaneously something slid through the remaining undergrowth and into the water like a flash. Realising that it was a python I slid down the bank after it without losing a second, yet never saw it but for that momentary glimpse.

The most peculiar place in which I ever caught one was in a crate containing a new stove lately arrived from England. The men who were engaged in unpacking it and removing the straw had something of a shock on seeing two feet of snake slide out in response to their hammering. It withdrew at once so they

fetched me, it was however only a six foot specimen and had doubtless entered the building in which the crate was standing, in search of rats.

I am quite prepared to believe that this snake may attain to a length of thirty feet. I have measured a freshly removed skin which was exactly thirty feet though in the flesh such a monster would probably not be very much over twenty-five feet. This individual had been speared by natives on the bank of the Ngere-ngere River near Morogoro. Two other skins which I purchased in the same locality measured eighteen feet each. The two largest living pythons which I have kept in captivity measured eleven and twelve feet respectively, the weight of the latter when brought to me was exactly thirty pounds but when it left me six months later for a bush life, it must have been nearer forty.

In view of the widely-believed theory that these big snakes will not take dead food, perhaps the diary of this specimen may prove of interest:—

September 12th. The python was brought to the writer by a native. It was made as comfortable as possible in a netted cage 12ft × 6ft × 6ft which had a stream of water running through and flowing over a tank sunk in the centre of the cage. However it was not content and having forced a weak spot in the wire netting it absconded during the night. A broad track in the dust led right past my tent door and down through the camp past marquees where three hundred natives were sleeping. One old native admitted having seen it about midnight but hurried back to his blankets supposing that "it was a Swahili". This idea, that the souls of certain distinguished people enter into the bodies of snakes is not an uncommon belief among the natives.

September 18th. Nearly a week later, at about 8 a.m. there were cries of "Nyoka", and presently a boy came running in to say that a big snake had been found in the bush near an askari village, 300 yards from my tent. As my snake stick had been broken the previous evening and had to be repaired it was ten minutes later before we reached the spot where I soon recognised my deserter lying beneath a heap of brushwood alongside a fallen tree in the bush.

A native woman was hopping about like a restless sparrow on the trunk of the tree and shouting information to three others who had withdrawn to what they considered a reasonable distance thirty feet away. All were armed with pangas with which they had been chopping off the branches of the fallen tree when they had discovered the python.

Despite the fact that the woman was shrieking information about him back to the village in answer to a hail of interrogations. the reptile never moved nor even when my assistant lifted off the

brambles and thornbush immediately above it. The first movement was when the writer advanced his hand to seize him and he gave a lunge with open jaws; not necessarily with the intention of seizing, but rather to intimidate after the fashion of a dog shewing its teeth and growling. Almost simultaneously he commenced sliding backwards but this was circumvented by placing my boot lightly on its neck which was then grasped with both hands. For a few moments a tussle ensued and considerable strength had to be exerted to get it clear before it could be crowded into a bag. On being turned out into its cage it flew at the wires striking them forcibly several times in attempting to reach the crowd of natives who were watching.

September 20th. At 1 a.m. I was roused from sleep by an orderly, "Did I want a fine big snake?" Of course I did, so hurriedly donning socks and slippers I accompanied him to the mess marquee of the sick officers' wards 400 yards away. On the way we came on a broad track in the dust and for the first time it occurred to me that my pet had once more strayed from home. It was lying beneath the table and as we entered with no light beyond that from a somewhat feeble lantern, it struck out with widely gaping jaws a couple of times. It appeared to be excited and more lively than in the daytime.

As it started to retire I made a detour of the table and seized it by the neck just as the orderly placing the lantern on the floor went off in answer to a call. For fully two minutes I struggled with the creature slipping its coils off my arm before it tightened them; having my foot upon its tail gave me an advantage and on getting its head into my sack there was no further trouble. Once shewn the way a python will readily slide into the darkness and fancied security of a sack as a general rule.

For a month after this it spent its nights in roaming round its cage, running its snout up and down the wires in search of an exit. The result of this was that it got its jaws into a nasty raw state with a fungoid growth on the raw spots. To remedy this I bathed it with boric solution on October 15th and 27th and introduced three rats into its mouth which it swallowed with some reluctance. These three rats were all the food it had had to eat between September 12th and November 27th when it cast its skin and came forth resplendent in a new and iridescent garment.

On November 28th it caught and ate a newly-fledged Kingfisher which I was keeping in the same cage.

On December 1st it caught and ate a fledgling Goshawk in the same manner, this bird was one of a pair which I was hoping to rear.

The following day, hearing the monkeys making a great noise I hastened out to find the python sliding silently towards the bush in which was the imitation nest containing the remaining Goshawk. I removed the young bird just in time for returning immediately I found the python had raised himself to, and was nosing round in the empty nest.

On the 2nd of December it was given a dead fowl, which it ate. On the 12th a dead rat and also two headless, tailless, and wingless Blue Rollers that were smelling badly. It defaecated a large quantity of hair and feathers and apparently disgorged the quills of the fowl which had been swallowed three days previously.

On December 14th it distinguished itself by not only taking a dead wingless Fruit Pigeon but also the skinned body of a Cattle Egret. Having got the body cross-wise in its mouth it was in great difficulties, but on my taking hold of its neck, gaped and dropped it with ease. It then took it up again and swallowed it without any further trouble.

During the month of January it ate eleven fowls, two ducks, and a Pied Crow, though hitherto it had consistently refused crows, doubtless on account of their large beaks, this crow being nearly as large as an English raven.

On March 16th it escaped.

On November 3rd three Pythons were brought to me which were approximately eight feet, six feet, and four feet in length. The two larger specimens I placed in a sack beneath my bed in the tent but they escaped the same night. An eleven foot specimen which was caught in a fowl run one night was carried about in a sack for two months but as there seemed no likelihood of the writer being permanently stationed in one spot he chloroformed it and on examining the stomach found several species of worms.

Another parasite to which they are addicted (*Filaria sp.*) raises small pimples beneath the scales which on examination will be found to contain a minute larval worm neatly coiled up. Snakes so affected lose their glossy and iridescent appearance, refuse to feed and succumb in the course of a few months. Ticks are also commonly found on these big snakes.

The next family, the *Colubridae*, contains no less than sixty-eight of the snakes of the Territory. It has been sub-divided into three sections, of which the first consists of harmless snakes with solid ungrooved teeth (*Aglypha*) such as the English Grass Snake. It is interesting to note that East Africa has its representative of the same genus in the Olive Grass Snake which is to be met with in swampy places on the outskirts of Dar es Salaam and elsewhere in the Territory. Its habits are very similar to those of its English cousin and a specimen which the writer kept in captivity fed heartily on frogs. On the fifteenth of June, 1918, it laid eight eggs measuring 17 × 8mm.

The little-known British Smooth Snake also has an ally of the same genus in East Africa in the person of the Semi-ornate Smooth Snake which I also took at Dar es Salaam and kept in captivity for a time.

Perhaps, however, the commonest of all these harmless colubrines is the Brown House Snake which is more often black than brown in the adults. It owes its name to the frequency with which it is discovered in the haunts of man such as among rubbish in an outhouse, in rooms, under old sacks or sheets of iron in the open. One specimen taken in my chop-box beneath my bed had just swallowed a mouse and on taking up a sheet of iron beneath the box two cast skins were revealed seeming to indicate that it had been frequenting the spot for some months.

The reason for their entering houses is to be found in their almost exclusive diet of rodents. One such specimen had swallowed a rat and was found with a foot of its tail hanging out of a crevice in the stone basework of my house at Kilosa. The snake was so wedged into the masonry that much of the latter had to be removed before the snake could be extricated. It is almost incredible what a House Snake can swallow, and a snake's last meal is often outlined by the distended skin and separated scales in the region of the stomach. A specimen four inches short of three feet was found with a large Unstriped Grass Rat in its stomach in the Singida District.

They attain a length of four feet and constrict their prey before swallowing. When captured by man House Snakes almost invariably bite savagely with the result that its small pin-points of teeth break off and are left in the skin. Whilst as a general rule they tame down in captivity certain individuals will remain irascible and ferocious to the end.

On a kopje at Tabora I came upon a Stripe-bellied Sand Snake swallowing a young House Snake, on my appearance the Sand Snake disgorged its prey and made off. I put the House Snake in my pocket but on arrival at camp, found it dead; presumably it had succumbed to the venom of the Sand Snake.

Nearly related to the House Snakes are the small Wolf Snakes which rarely exceed a foot in length in East Africa, the Cape Wolf Snake is the commonest form and in habits resembles the House Snake. A much rarer species is Jackson's Wolf Snake of which one was captured in a tent at Longido West in the act of swallowing a Ferrandi's Skink which proved rather a large mouthful for it.

The harmless and slender Green Snakes of which there are seven species in the Territory, are familiar to most people and even natives condescend to call them harmless. They like to lie and bask upon bushes, particularly in the neighbourhood of water

presumably on account of their liking for frogs, but I have known five killed in a garden in the course of a morning and on one occasion one of the common species put its head out of a hair-brush case on the dressing table. Another specimen was found to have dined off three small skinks. The young of the venomous Green Mamba is superficially very similar in appearance to these harmless snakes so unless one is familiar with both forms care should be exercised in capturing such.

Closely related to the Green Snakes is the Spotted Wood Snake of similar habits but readily distinguished by the black, and sometimes whitish also, blotches on its green scales. The largest specimen of a good series taken at Morogoro by the writer was just over four feet. Six eggs are produced at a time. During the campaign I happened to go into the medical inspection tent of one of the stationary hospitals and had just seated myself to write a note when an Indian orderly entered with a letter in one hand, and the very battered remains of a young Wood Snake in the other, but quite recognisable even at a distance of five feet.

"Oh! He's been bitten by a snake, what shall we do?" exclaimed the R.A.M.C. orderly-in-charge as he seized a bottle of iodine and made for his victim. I looked up from my writing and told him he need do nothing as the snake was perfectly harmless. "Oh had'nt I better put on a little iodine?" queried this disciple of Aesculapius. I requested the Indian to give me the letter which was from a Major saying that his orderly had been bitten by a snake and required treatment, wrote on the foot of it that the snake being harmless no treatment would be required, and signified to the man he could depart. He was not however, at all satisfied at this summary dismissal and kept saying "Sahib, Sahib" and looking from one to the other. I then beckoned to him to follow me and taking him to my tent nearby, drew out a biscuit tin from under the table and from it took the largest Spotted Wood Snake and placed it beside his specimen so that he might observe the likeness. Then opening the snake's mouth I inserted my little finger and allowed it to bite on it. The Indian nodded vigorously, grinned, and went away happy.

Of all the harmless snakes without doubt the most interesting is the Egg-eater which occurs sparsely throughout most of the Territory. It is so variable in its colouration that it is almost impossible to describe. I have taken all-black and all-brown individuals, brown with white specklings above and delicate rose-pink below, another was iron-clad grey with a single row of brick-red dorsal spots and another form taken at Kilosa 'mimics' the colouration and markings of the Rhombic Night Adder which however, does not occur at Kilosa. The broad scales on the throat (also found in the Night Adders) and the keeled scales

with head scarcely, or not at all, broader than the 'neck' serve to distinguish it, and once known it is always recognisable in whatever colour it happens to be.

The interest of the creature lies in its ability to swallow eggs even as large as fowls' though in a state of nature it doubtless lives chiefly on those of small birds. It is suitably adapted for its specialised diet by a reduction of teeth which makes it possible for the snake to swallow the egg without breaking it. When the egg has reached the gullet it comes in contact with projections (*hypophyses*) from the vertebrae which actually have penetrated the gullet and now serve the purpose of teeth. By muscular action these are brought to bear on the egg which being split and finally crushed the snake raises its head and allows the whole of the contents to pass down into the stomach and a moment or two later ejects the crushed egg shell.

From one individual Egg-eater I have taken no less than seventy-five ticks though it is not usual for them to be so infected.

We now come to the second section of the *Colubridae* composed of snakes having grooved teeth set far back in the upper jaw *(Opisthoglypha)* generally beneath and slightly behind the eye. While these snakes are provided with poison the majority of them are harmless to man owing to their being unable to bring the grooved teeth into play, only the solid and harmless front teeth inflict the bite. When the snake is of large size, however, this need not follow as the gape is correspondingly large and in the classic case of the man Williams who was bitten by a Boomslange and nearly succumbed, one has ample proof of the highly toxic venom in one of the species at least. The object of these venom teeth so far back in the jaw is to give the quietus to a struggling lizard or rodent on which creatures members of this group chiefly prey.

There are so many species in the Territory that one can but select a few of the best known to comment upon. One of these is a big brown fellow with a slightly pinkish tinge to the brown and white beneath. Its scaly covering is very close-fitting and smooth and I have had captive specimens attaining a length of five feet. It is best recognised by the upper lip which is produced and downpointed with quite a beak-line effect, it has no English name and is known to science as *Rhamphiophis oxyrhynchus*. It is to be found at Dar es Salaam, Morogoro, Dodoma, and near Tabora.

The bite of this species would not appear to be dangerous, my native collector was much bitten about the hands by a four-foot specimen he caught at Dar es Salaam and suffered no ill-effects. After the first excitement incidental to capture they settle down to a life of confinement and are quite the gentlest of snakes.

In diet they are omnivorous, a small specimen endeavoured to swallow a large rat but could not get past the front legs and was forced to disgorge, a larger specimen took a young rat and one which I have alive at the present time took several nestling rats in succession, a wild specimen disgorged a shrew on being caught. There are few creatures whose palates will permit them to eat shrews. In captivity I feed them on Striped Skinks which they take readily.

They have been observed to pair in a wild state at Kilosa in December and the female being caught laid ten eggs measuring 40 × 20 mm. during the first week of the following March so that the period of gestation is about three months. The number of eggs varies from eight to thirteen and I have known them laid in July and October so there would appear to be no definite breeding season.

On several occasions this species has been dug out of gerbil holes and once a very big one was found in the end of a burrow with a pair of Ivor's Mungoose. At Morogoro a young one was recovered from the stomach of a hawk (*Butastur rufipennis*).

A still commoner reptile is the Stripe-bellied Sand Snake known as Sangaraza in Kiswahili which may quite probably be the commonest snake in the Territory. It is brown above, yellow beneath with two paralled brown lines running the whole length though in certain localities these latter may be indistinct or missing. The reptile is of slender habit and is fond of sunning on bushes though it is more often encountered shooting across a path and I have taken several in the thatches of native huts whither they had gone in pursuit of Striped Skinks or House Geckos.

This species will eat mammals, birds, snakes and lizards. A specimen taken at Frere Town after a hard chase was placed in an ordinary small biscuit tin about eight inches by five in size. The following day a native brought me a warbler with its head almost knocked off, this I dropped into the tin and on opening it the following day I found a bulge in the snake and no visible bird. This freshly-caught diurnal snake had eaten a damaged dead bird in the darkness and confinement of a small tin the day succeeding capture. There is no saying what a snake will do.

This same snake when first seen was stretched out at full length excepting that its head was turned around in the direction of its tail. It then passed its head beneath the body, then over the back, then beneath the body again, and so on traversing its own length towards the tail. This was not done hurriedly but in dallying fashion with occasional withdrawing of the head. Unfortunately a native running up at this moment disturbed it so that I was unable to see the end of the performance but a captive specimen two years later was seen to do very much the

same thing excepting that the head was not passed beneath the body but the right side of the snake's mouth was rubbed against its right side, then the left side of the mouth against the left side and so on in slow progression towards the tail after which the snake moved quietly away into the grass. I feel sure that we have here instances of snakes at play.

Many species of worms were found in the stomachs of various individuals of the Stripe-bellied Sand Snake on which they were parasitic.

A closely related species is the Hissing Sand Snake which attains a length of five feet and is of a plumbeous hue with white lips finely speckled with black. This reptile will eat both mammals and lizards. I took a large mouse from the stomach of a specimen sunning itself by the river at Morogoro. It will also take dead food at times for when one was trying to drag a mouse from a *Rhamphiophis* that was constricting it, I removed the Sand Snake to another cage and tossed it a dead mouse which it seized and swallowed immediately. This species feeds so readily in captivity that it might almost be said to take its food from one's fingers. The following note will shew what voracity an individual can exhibit.

I first put a live mouse into the cage, it was seized almost as soon as it touched the gravel in the vivarium, was chewed and swallowed. A naked nestling rat then followed. I then put in two skinks, the larger Sand Snake almost took one from my fingers and the other skink jumped into the water tin. After watching this lizard for a moment the second snake slid up to its companion which had seized the skink and watched it intently. Gradually approaching, it made a grab at the skink as snake 'A' was changing it hold. The jaws of 'A' enveloped the upper jaw and head of 'B', but 'B's' mouth closed on 'A's lower jaw and, both parties chewed vigorously.

Seizing the combatants I attempted to extricate them from the tangle but as their small hooked teeth were so firmly fixed I left to get a pair of forceps. On my return I found that they had both dropped the skink and 'A' had seized 'B' by the neck—a great commotion ensued 'B' attempting to get his coils round 'A's' neck. Finally 'B' became exhausted, and 'A' working 'B's' head round till the snout was in his own mouth, commenced to swallow. After a foot of 'B' was out of sight 'A' lost heart and gaping widely reversed gear and disgorged poor 'B' who made off with a gory head and slimy skin. After taking a couple of turns round the case 'A' poked around till it found the skink which it seized and swallowed.

Ten days later they commenced a second fight but did not go to such lengths as in the first. To quiet 'A', he was given a very large Yellow-throated Lizard which, though a very big

mouthful, only appeased his appetite for two days after which he attempted to remove a mouse from the coils of a *Rhamphiophis* as already related, wishing to avoid futher trouble I removed this quarrelsome reptile to another cage were there was only a Stripe-bellied Sand Snake. This latter snake died twenty day's later, partly perhaps because its cage-mate took all the food. I thereupon fed a skink to the Hissing Sand Snake and as he gulped down the last of it I introduced the head of the Stripe-bellied Snake into its mouth and it continued to swallow its cousin till it was all gone. The two reptiles were the same length but the swallowed was a much more slender snake than the swallower, the dinner could be quite easily made out lying doubled up in the diner. The latter was so replete that he could not coil up but lay in a large circle for eight days when he appeared to have returned to more normal proportions and began to move about, but alas the meal had been too heavy a one, for eleven days later he died and on opening the abdomen I found the intestines choked with the vertebrae and scales of its last meal. Evidently its gastric juice was unable to cope with this last luncheon in view of the previous heavy demands made upon it.

The species has many enemies also. On June 4th 1917 I was stalking an eagle when the bird disappeared for a moment to rise almost immediately from a mealie patch bearing one of these snakes in its talons. Whilst circling low over the writer's head it seized the snake in its beak, and still holding it in its talons, swallowed it on the wing. On June 8th I shot another species from the same tree—this time a Black-breasted Harrier Eagle—which had a Hissing Sand Snake in its stomach.

One day some natives brought me a fine Black-necked Cobra which they had killed in the act of swallowing a large Sand Snake. The cobra measured 50½ inches and had already swallowed 28 inches of Sand Snake whose body alone measured 33½ inches, unfortunately in the excitement of killing the cobra the greater part of the tail of the Sand Snake had been struck off but other specimens with this body length had tails of between 12 and 13 inches so that we can calculate that a 50½ inch snake was engaged in swallowing a 46 inch snake and would doubtless have succeeded but for the interruption.

At 8 a.m. one morning whilst crossing the Wembere Flats I came upon a Sand Snake apparently dying with thirst. It offered no resistance to being picked up and died shortly afterwards. Its stomach was clean and empty. With the exception of one well, I knew of no water within a radius of twenty miles.

The Bird Snake deserves brief mention if only because it affords one of the finest examples of cryptic colouring amongst East African snakes. The long and slender body is vine-like in its proportions and coloured for the part. In Morogoro speci-

mens the leaf-shaped head was leaf-green on the crown but a specimen caught at Zengeragusu had the head coloured the same as the body. The tongue is bright red with a black tip. When annoyed or scared they inflate their throats vertically as a Boomslang does. One specimen, measuring 53 inches, on its way back to captivity swallowed its travelling companion, a very large Blind Snake, it subsequently escaped and was killed in a tree only 200 yards from its cage two months later, it then had a chameleon in its stomach. Their principal food is lizards and often small birds when these hop within striking distance of the apparently inanimate vine branch with a curious flickering scarlet tongue.

The South African Boomslang or Tree Snake which occurs here in a bewildering number of colours and mixtures thereof, may be a vinous brown, grass-green, all-black or some intermediate blending of these colours. The largest I have killed was three inches short of six feet and was the best of eleven taken at Morogoro where they are very numerous in the trees forming the avenues.

A Boomslang of 68½ inches which I shot in Mozambique had a chameleon in its stomach. At Morogoro another fell out of a tree in the avenue together with a chameleon A green Boomslang and a chameleon of mine escaped about the same time and a few days later I recaptured the boomslang in the nearest tree with what was probably the escaped chameleon in its mouth. A few days later another brown Boomslang fell out of a nearby tree with a chameleon. All these incidents occurred within a month of each other shewing that though the Boomslang may like a chameleon diet, or be forced to it when birds can't be caught, he has considerable difficulty in mastering his prey seeing that no less than three fell from trees when attempting to do so.

I therefore introduced a chameleon into the cage of a very large and black Boomslang. The snake immediately approached the chameleon, sliding silently towards it with raised head; the chameleon therupon raised its occipital flaps, inflated its throat, and swayed about from side to side suddenly lunging forwards with widely gaping mouth and uttering a hiss. I then removed it from the cage but fed several snakes on them later when pushed for food.

A brown boomslang was bitten by a puff adder, which would doubtless have eaten it had it not been removed from the vivarium. It died very quickly and on eviscerating it, the heart was found to be still beating quite ten minutes after it had been bitten; the site of the bite, some three inches anterior to the vent, was in a fearful state, and had one not known the circumstances it might well have been thought that the creature was in the last

stages of putrefaction. The scales were loose and falling off, pinkish blood oozed from between them and from the vent, the fatty deposits were speckled with blood, and the intestines were full and oozing with the same. The whole region was blown up as if with gas and had the puffy appearance of decomposition.

Passing over a large number of smaller forms we come to the final section of the *Colubridae* in which it is the front teeth that are grooved on their anterior surface and thus conduct the venom (*Proteroglypha*). It is to this section that many of the most venomous snakes of the world belong, including the sea snakes of which one species, the Brown-and-Yellow Sea Snake, it said to be found upon our coasts. The Indian Ocean is its home but it is found from Australia to Panama. The tail of sea snakes is laterally compressed and oar-shaped for it is adapted to the purposes of an oar to propel its owner through the water and when cast up on the shore after a storm the majority of these snakes are very helpless. Another wonderful provision for their role in life is a valve which closes the nostrils whilst they are under water. All the species feed on fish and it is to kill these rapidly that they require this potent venom which has cost many a fisherman his life on the Karachi coast when attempting to remove one of these creatures from his net.

Of cobras there are three species in the Territory, and because these snakes do not go about with hoods erect and swaying in the classic manner as they are portrayed in pictures it is often difficult to convince folk that they may yet be cobras. Unless disturbed the cobra has the appearance of any other snake, it is only when annoyed or cornered or scared that he erects his hood. The Black-lipped Cobra is only found in the western portions of the country, the Egyptian Cobra is very rare and the only examples I have seen were from Mt. Longido and Kilosa. It attains a great size and has been known to spit like the common species.

The Black-necked or Common Spitting Cobra of the country is to be met with everywhere and in some places like Morogoro is a very common snake. At Nairobi an olive-coloured form is found which has lemon-yellow markings on the throat, the commoner slatey-black form is also found there however, sometimes, especially in young specimens it is quite greyish or slate-color and both these forms have pink bars on the throat. At Longido the usual type is uniform salmon pink, this may be without markings of any kind, or as in one specimen which I caught, there may be a black band on the throat seven scales in width. Two specimens killed at Mombasa were a slatey or slightly greenish-grey above, the belly was dirty-white with indistinct or isolated smudges on the ventral scales with a highly iridescent brown band fourteen scales wide on the throat. A Mwanza

specimen was all-black above and mottled white and black below without any gular banding. Five foot specimens are nothing very remarkable.

Owing to their habit of ejecting their venom at the eyes of anyone that disturbs them their capture is invariably an exciting matter. Unless the venom happens into a cut or abrasion of the skin there is no danger—the exception is the eyes and it is at these that the cobra aims with remarkable precision. The immediate result is intense pain and blindness caused by the superficial bloodvessels absorbing the venom. This conjunctivitis subsides in a few days if remedial measures are taken, such as bathing the eye in a weak solution of pot. permanganate, boric, or milk.

Mammals, birds, reptiles and amphibia are alike included in the dietary of this species and no doubt this fact explains its wide distribution and numbers. On arriving at Frere Town I was informed by my host that he had been much plagued by a cobra in his fowl house. During the three previous nights it had killed six pigeons, two pigeons, and one pigeon respectively. At 7 o'clock that evening I received a message that the cobra was now in the fowl house coiled among the rafters about 12 feet from the ground. On arrival I saw a capture was impossible and sent back for a 410 gun from which I delivered a charge of No. 10 shot. The concussion in the small iron building dislodged the dust of years and we had to retire. We returned. There was a flop, and down fell the cobra at our feet still writhing and striking this way and that. It measured 64 inches and in its stomach was a young pigeon whilst two pigeon's eggs were in its gullet.

Twelve days later, just after dark, there was another great outcry amongst the poultry, and my host running out with a stick surprised a 66½ inch cobra swallowing a chicken, taken thus at a disadvantage it was easily dispatched. It was of course stated that it was the mate of the first come in search of its fellow but unfortunately for this popular belief both were females.

At Morogoro a native brought me a chicken coop containing one dead cobra, one fowl also dead, and three chickens one of which was headless. A few days earlier this snake was supposed to have taken three chickens from the same coop. This time the natives hearing cackling ran out and killed the snake but not before it had bitten the fowl and her brood. Opening the snake I found one chicken in its stomach and a chicken's head in its gullet, and so surmise that it was in the act of swallowing it when struck by the boys who probably knocked off the chicken's body in their attempt to hit the snake upon the head. The length of this specimen was 51 inches.

I have already spoken of a cobra killed whilst swallowing a sand snake. I have known one to eat four toads in a fortnight, another three in one day, and a still more remarkable case of gluttony occurred at Morogoro. I went out with a lamp and put two toads in a snake's cage which was occupied by only a half-grown cobra. It seized the first toad and when I returned was chasing the other round the cage with the first in its mouth. It struck at it again and again but of course without effect. It then paused and swallowed very energetically. When the first was disposed of the second was bitten in the abdomen, held for half-a-minute then releaseed, but as it began to hop it was seized by the hind leg and for nearly twenty minutes the cobra attempted to swallow it hind end foremost. At the end of that time it took the head in its mouth and swallowed it with ease. Precisely the same thing occurred with the third toad which speaks badly for the reputed intelligence of the cobra. A fourth and fifth toad followed but I did not stay to witness their engorgement. Six days later this half-grown cobra had resumed its normal proportions.

Its dietary leads it to frequent the haunts of man where it is often found in sheds, fowl-houses, rubbish-heaps, and tents. In the bush they prefer to take up their abode in termite heaps upon which they like to lie and bask in the morning sunshine.

I met a weird old 'snake charmer' in Mwanza District who had in his possession a 68 inch cobra which he kept in a small bark basket. The first time I saw him playing with it, when he came to put it back in its box the snake slid out; this happened two or three times resulting in his slapping its head when quick as thought it 'spat' in his face, (and as he was stooping over the box his face was not two feet from the snake). I was within four feet myself and remarked that no venom accompanied the open-jawed hiss, to which he replied with a laugh that its venom was finished. He elected to become a camp follower for a small consideration. A few days after when he was holding his daily display—tying the cobra round his naked waist or wrapping it two or three times round his neck and flinging is head so unceremoniously over his shoulder that it struck his back with a resounding thwack—my curiosity was so piqued that I bought it from him and chloroformed it, only to find that the poison teeth and parotid glands were intact!

There are also three mambas attributed to the Territory but one of these from Kilimanjaro is based on what may be an aberrant specimen and the other found in the most westerly districts is so similar to the common species that the difference is only a matter of interest to specialists. The Common or South African Mamba which is widely distributed in the Territory appears to be only present in its green phase which obtains till

they reach a length of 6 feet, specimens above this length are generally of an olive colour and I have no doubt that the bright green tends to become olive in the adult. The largest example which I have ever kept in captivity measured 8 ft. 1½ inches and was kept with another measuring 7 ft. 3¼ inches for six and five months respectively.

It is a common mistake amongst Europeans in East Africa to call any black snake, and in particular the Black-necked Cobra, "a black Mamba". During the campaign a sentry at Morogoro killed a 3 foot 6 inch cobra not far from my quarters. Two days later someone informed me that a mamba nearly six feet long had been killed by the sentry, which furnishes a very good example of tropical growth. On another occasion a Sergeant sent me a note to say there were "three black mamba" in his fowl house. I was out at the time but my native collector went and found a single cobra which had bitten a fowl. Snakes multiply very rapidly in the East.

The Common Mamba as known in South Africa is without doubt the most aggressive and venomous of African snakes, if it gets in a good bite there is no hope for the victim. Living in trees it frequently, and apparently wantonly, strikes at persons passing beneath. That the Wakami and Wanyamwezi have a treatment for snake bite by a lengthy process of inoculation there is no doubt. My snake-collector, Machairi, was bitten by a half-grown mamba and the only result was that he was violently sick and unwell for three days and had a nasty ulcer on the back of the hand where he was bitten. On being bitten he took his 'dawa' orally and by inoculation. As I took the snake from him, it very nearly got me by twisting round, the skin on the neck of mambas being very slack.

The two large specimens when first confined were very active and struck at the glass whenever anyone approached; possibly realising the futility of this procedure which gave them sore snouts, they abandoned it but continued for a couple of months to draw themselves up, and threaten the visitor with widely open jaws. In time even this menace was given up, but till the last they continued to follow every movement of the onlooker with bright eyes and quick turns of the head. Their deaths were purely accidental. It was my custom to pull them out of their case by the scruff of their necks once a fortnight for cleaning purposes. On the last occasion I had transferred them to a tin-lined box, which was exposed to the sun, whilst I cleaned out their cage. In the midst of this work a friend called and we withdrew for tea and on my returning an hour later I found the hapless reptiles dead, they had undoubtedly died from the heat of the sun, and had there been water in the box to create a moist atmosphere this would not have happened.

One of them had only that morning eaten two large House Rats and now measured 6½ inches in circumferance round the stomach. Opening this I found that the flesh and fur had already been digested from the rat swallowed eight hours previously. They fed readily enough and it was rather a difficulty to keep up the supply of rats and mice; for, though they struck at and killed large rats introduced into their cage, probably from fear; except on a few unique occasions they did not swallow them. I have always found mambas exceedingly shy of feeding when watched, I think they realise they can be taken at a disadvantage and they will not start to eat when one is about. I have surprised one with a dead weaver bird which it was swallowing and it dropped the bird at once to menace the onlooker.

When out bird's-nesting in 1917 came upon a dead Bishop Bird sitting upon three eggs containing young which I believe were alive. The bird was so fresh that I was able to skin it twelve hours after finding. The next day not twenty feet from this place I found a green mamba lying on the busnes. In all probability it had struck at the weaver which had just sufficient vigour to flutter to its nest and there die.

The remaining family is that of the *Viperidae* in which the poison fangs are greatly enlarged and the venom flows down a hollow canal in the centre of the tooth and is discharged from the point after the manner of a hypodermic syringe, a person bitten through a garment gets the full benefit of the venom.

By far the most widely distributed and commonest snake of this family is the Puff Adder, identical with the same creature of South Africa though Eastern Equatoria holds the record for size. The chief danger of this species is that it lies motionless in a path and does not attempt to get of the way of a pedestrian as other snakes do, then, if trodden upon, it naturally resents it and with the idea of self-protection uses it teeth. In captivity they are quite well behaved creatures never attempting to bite. Like the cobra their search for rats causes them to turn up in all manner of unexpected places of which perhaps the most disconcerting is one's bed. At 2 a.m. one morning I was roused by a native who said that my big python (which had escaped a few days before) was in his bed, that he had turned over in the night and disturbed it so that it hissed. Pulling on my slippers I went down to the grass hut and cautiously pushing open the door, found, not my python, but a Puff Adder hissing and blowing in the characteristic vigorous manner which has gained it its name. Owing to the head being so much broader than the 'neck' it is one of the easiet of snakes to pick up.

Like so many snakes the colouration is very variable and may be reddish, chocolate brown, or even lemon-yellow with various other coloured markings superimposed on these ground colours. The largest specimen I have yet come across was a female at

Kilosa measuring 43½ inches. They are said to attain to a length of five feet.

On November 18th. 1915 I killed an Adder at West Kenia which held 38 eggs as large as those of a domestic pigeon; there were 24 in the right oviduct and 14 in the left. On November 28th. 1917 I chloroformed and examined a female which had 40 eggs in the right ovary and 31 eggs in the left—a total family of 71 impending. On February 16th 1917 another female had 18 young adders in the right and 16 in the left. These measured 7 inches each in length and were very near birth.

Closely related to the Puff Adder are the Gaboon Viper and the Rhinoceros-horned Viper, both are big bulky snakes. The former found from the Usambaras to Kilwa has a beautiful carpet-like pattern of rainbow hues upon its back and has the unenviable distinction of being known to 'spit' its venom on occasion. The Rhinoceros-horn has erectile and very horn-like scales anterior to the eyes. I have kept specimens of it in captivity but its habits do not differ from those of the common species as far as I could observe.

East Africa is the home of the Night Adders for all four species of the genera occur, though only three in this Territory as far as I am at present aware. The Common Night Adder is marked with rhombs in a chain down its back. It is usually found in rubbish-heaps, piles of stone, or among the litter of out-buildings. At night it emerges from its retreat and is then most frequently met with as it crosses paths or roads. When thus disturbed it coils up and displays a vicious disposition; if unmolested it sails off with the neck flattened like that of a cobra but not to the same extent; at such a time it carries the head raised five inches from the ground.

Like the Puff Adder its food consists largely of toads which it will eat readily in captivity. During the course of a week one individual ate nine very small toads, three small toads and one largish frog. Two days after I chloroformed the adder and found only the hind legs of the frog remained of this meal.

The Tree Vipers, of which there are three species, are so entirely different from what one's impression of an adder should be that one cannot pass them entirely without notice though of rare occurrence. Whilst the bright leaf-green body is slenderer than in the ground-haunting vipers it retains the triangular head and can therefore be readily distinguished from other tree snakes.

The last remaining group of adders to be considered are so entirely different from all the rest in their outline that there is considerable danger of them being mistaken for harmless species unless the mouth is examined and the huge fangs revealed, like those of all vipers these rotate on the maxillary bones so as to

fold back when the mouth is closed. These snakes are the Burrowing Vipers of which half-a-dozen species are found in the Territory, the three species with which the writer is acquainted are all black or plumbeous in colour. The body is slender and in conformity with their burrowing habits the head is no broader than the body.

Like the Blind Snakes they come to the surface after rain and in travelling over the surface hold their sharply-pointed (in some species rounded) snout at a peculiar angle as if ready to dig down into the soil at a moment's notice. They are surprisingly quick and in attempting to pick one up which had found its way into a tent one day it struck me on the top of the thumb, fortunately I saw the movement, and withdrew my hand as the snake struck so that I only felt a slight prick on the skin which happened to be somewhat horny at the time. Held in a pair of forceps the snake will strike at them vigorously and the straw-coloured venom trickle down in large drops.

The following key which is copied from Dr. Bonlenger's "A List of the Snakes of East Africa, etc" which appeared in the Proceedings of the Zoological Society in 1915 should enable anyone to at least determine to what family their snake belongs. It is hardly necessary to add that the key is only applicable to East African snakes.

I. Worm-like, with small inferior mouth, eyes hidden or visible under the head shields, and body covered with uniform umbricate scales above and beneath.
  18 scales or more round middle of body; ocular not bordering the mouth; tail not, or but little, longer than the head ... ... *Typhlopidae*
  14 scales round middle of body ... ... *Glauconiidae*

II. Mouth large, eyes exposed; body with enlarged shields beneath (except in the marine genus *Hydrus*)
  Ventral shields much narrower than the body; supraocular, if distinct, broken up into two or more shields... ... ... *Boidae*
  Vetral shields at least nearly as broad as the body; supraocular single, poison-fangs, if present, not in a very large sheath... ... *Colubridae*
  Ventral shields at least nearly as broad as the body; large poison-fangs in a very large sheath below the eye... ... ... *Viperidae*

The ocular is the shield covering the eye in the so-called 'Blind Snakes', the supraocular the shield, or if divided, the shields above it. The ventrals are the broad shields on the under-surface of the body as the subcaudals are on the lower surface of the tail.